

The Impact of Digital Finance on High-Tech Enterprise Value

Siyi Dong

School of Economics and Management, Nanjing University of Science and Technology, Nanjing,
Jiangsu, China

610980434@qq.com

Abstract. As an innovative financial model, digital finance seamlessly integrates the internet and cutting-edge information technologies with traditional financial services, thereby opening a new chapter in the financial sector. Innovation is the key driver of development; therefore, the steady growth of high-tech enterprises—which are innovation-driven—serves as a vital foundation for achieving high-quality economic development in China. Given that high-tech enterprises are characterized by long investment cycles and high levels of risk, stable and sustained financial support is particularly crucial. Based on the market efficiency hypothesis, financial intermediation, information asymmetry, and transaction cost theory, this study examines listed high-tech enterprises from 2011 to 2020. It constructs fixed-effects and mediation models to conduct an empirical analysis of the impact of digital finance on the value of high-tech enterprises and further employs a series of robustness tests to ensure the accuracy of the results. Based on the empirical results, the study concludes that digital finance promotes the value enhancement of high-tech enterprises; digital finance influences technological innovation, thereby enhancing enterprise value; and there are differences in the promotional effect of digital finance on the value of high-tech enterprises between China's eastern regions and its central and western regions. Based on these findings, the study proposes corresponding policy recommendations: to continue advancing the development of digital finance; to emphasize the role of technological innovation in enterprise growth and economic development; and to prioritize the coordinated development of digital finance across different regions.

Keywords: Digital Finance, High-Tech Enterprises, Enterprise Value, Technological Innovation, Inter-mediary Effects.

1. Introduction

1.1. Research Background and Significance

China's 14th Five-Year Plan states that innovation is a key factor in driving development. In 2020, the State Council outlined a path for the high-tech industry to promote high-quality development by using innovation as a driving force. To align with the government's goal of achieving high-quality economic development, research into how to foster the growth of high-tech enterprises has become a hot topic. The financial sector plays a crucial role in corporate financing, investment, and customer service; its development undoubtedly has a direct or indirect impact on the growth of high-tech enterprises.

Digital finance, with its low transaction costs, ability to meet the needs of a vast customer base, and capacity to transcend the constraints of time and space, has emerged as a new form of finance. China has put forward numerous plans for leveraging digital finance to promote high-quality economic development, including: establishing and improving a more efficient financial ecosystem; promoting the globalization and internationalization of financial markets; and strengthening the formulation and refinement of regulatory frameworks for digital finance. The emergence and development of digital finance have a positive impact on high-tech enterprises. By leveraging advanced technologies, digital finance can help these enterprises identify precise customer segments, reduce financing and operational costs, and drive product innovation. However, current research primarily focuses on areas such as digital inclusive finance, impact studies, and rural revitalization, with relatively little attention paid to high-tech enterprises. As a form of fintech, digital finance is transforming the landscape of the financial sector and exerting a profound influence on high-tech enterprises. Studying the impact of digital finance on the value of high-tech enterprises not only helps

us understand how financial innovation drives corporate development but also provides a basis for decision-making by policymakers and corporate managers, thereby promoting economic development and corporate upgrading. Therefore, this study on the impact of digital finance on the value of high-tech enterprises is of great significance.

1.2. Research Content and Methods

1.2.1. Research Content

In the introduction, this paper first provides a detailed exposition of the research background and significance, aiming to establish a clear research framework and starting point. Subsequently, the paper outlines the overall research scope, including the definition of digital finance and the mechanisms through which it influences the value of high-tech enterprises. Next, the research methods are explained in detail to ensure the rigor and scientific integrity of the research process, laying a solid foundation for subsequent work. A technology roadmap is then presented, and the study concludes by highlighting innovations and limitations.

The literature review section first focuses on the research field of digital finance development, delving deeply into the reasons for its emergence and its far-reaching impacts. It then shifts to research on the valuation of high-tech enterprises, detailing the current theoretical frameworks, methods, and practical applications for valuing such enterprises. The focus subsequently shifts to the current state of research on the impact of digital finance on enterprise value, analyzing the main research conclusions on this topic from the existing literature.

The “Theoretical Foundation and Research Hypotheses” section begins by systematically outlining the existing academic theoretical frameworks underpinning the discussion of corporate value; these theories provide a solid foundation for understanding the formation and changes in corporate value. Building on this theoretical foundation, the study then explicitly formulates research hypotheses aimed at investigating the impact of specific variables on corporate value. These hypotheses provide direction and a basis for the subsequent empirical research, ensuring the study’s relevance and validity.

The “Variable Selection and Data Processing” section marks the formal entry into the empirical phase. It first explains the sources and rationale for variable selection, followed by a description of data acquisition methods, processing procedures, and the rationale behind them, thereby laying the foundation for modeling.

In the “Empirical Analysis” section, an in-depth mathematical and statistical analysis of the obtained panel data is first conducted. This includes descriptive statistics to reflect the essential characteristics and distribution of the data, as well as correlation analysis to identify the relationships among variables. Subsequently, to test the research hypotheses proposed earlier, a fixed-effects model is constructed, and a mediation model is employed for a more comprehensive examination. The selection of these models aims to accurately capture the causal relationships among variables and to thoroughly analyze the mechanisms through which digital finance influences the value of high-tech enterprises. After completing the model construction and data analysis, the models undergo robustness tests. The purpose of this step is to ensure the reliability and stability of the research results, thereby enhancing the study’s credibility. Finally, a heterogeneity analysis was conducted to examine how the responsiveness of high-tech enterprise value to digital finance indicators varies across different regions.

The Conclusions and Recommendations section presents corresponding conclusions based on the research findings from the preceding chapters and offers appropriate policy recommendations.

1.2.2. Research Methods

The research methodology employed in this paper primarily consists of theoretical and empirical studies. In the theoretical section, we thoroughly explore the concepts of digital finance and high-tech enterprises, as well as their interrelationships, and—based on the current state of research—propose the following research question: to investigate the impact of digital finance on the value of high-tech enterprises. To achieve this research objective, we draw upon the Efficient Market Hypothesis,

financial intermediation, information asymmetry and incompleteness, and transaction cost theory as a solid theoretical foundation.

In the empirical section, after formulating the research hypotheses, we first selected China's provincial digital inclusive finance indicators from 2011 to 2020, along with financial data from listed high-tech enterprises, as the original sample for modeling. We conducted descriptive statistics and correlation analyses. Subsequently, after controlling for multicollinearity among variables, we examined the impact of digital finance on the value of high-tech enterprises by establishing fixed-effects and mediation models, with the mediation model specifically examining the mediating role of technological innovation. Robustness tests were then conducted on the models. Finally, an heterogeneity analysis was performed based on regional classification to examine differences in the impact of digital finance on the value of high-tech enterprises between eastern and central/western China, leading to the overall empirical conclusions.

1.2.3. Innovations and Limitations

The innovations of this study are as follows: First, unlike previous research on the socioeconomic benefits of digital finance, this study focuses on the more specific and detailed impact of digital finance on the value of high-tech enterprises. This represents a shift from macro-level to micro-level analysis. It allows for more specific empirical conclusions, provides more practical recommendations for enterprise development, and offers valuable insights for the formulation of economic policies. Second, by introducing technological innovation as an intermediary variable, this study examines the impact of digital finance on the value of high-tech enterprises. This provides valuable insights into whether enterprises can engage in technological innovation and the extent to which they can do so. Third, this study conducts a heterogeneity analysis to examine the varying degrees of impact of digital finance on high-tech enterprises within provinces in the eastern region versus those in the central and western regions. Through this comparative analysis, it offers policy references for promoting the sustained prosperity of China's eastern region and for guiding economic development in the central and western regions.

The limitations of this study are as follows: First, due to the relatively late development of digital finance, data on digital inclusive finance indicators are only available for the period 2011–2020, representing a relatively short time span. Second, as the focus of this study is the value of high-tech enterprises, the analysis is conducted at the micro level. However, there are significant gaps in the financial indicators of high-tech enterprises at the micro level due to difficulties in data collection; information on unlisted companies is unavailable, so the analysis is limited to listed high-tech enterprises, which may result in an incomplete data set.

2. Literature Review

2.1. Causes and Impacts of Digital Finance Development

The integration of digital technology with the financial industry has given rise to digital finance, which has not only improved the traditional offline model of financial services but also expanded the scope of business for the traditional financial sector, thereby promoting its development. The causes of its development are diverse, and it has had widespread and far-reaching impacts on the economy and society. The following sections discuss the causes of digital finance development and its macro- and micro-level impacts on the economy and society.

Scholars such as Huang Yiping et al. (2019) argue that the reasons for the development of digital finance include: overcoming the shortcomings of underdeveloped financial infrastructure; the existence of financial repression in society coupled with strong public demand for financial services, which has spurred the development of digital finance; digital financial innovation has also become more accessible due to relaxed financial regulations [1]. Specifically, the resolution of lagging financial infrastructure is reflected in the fact that traditional financial service systems suffer from insufficient coverage and low efficiency in some regions; digital finance can provide faster financial

services by building online platforms. For example, Ma Yingying (2024) found in her research that digital finance has a significant impact on the economic development of remote areas in Guangxi by driving the upgrading of traditional industries [2]. Digital finance meets user needs by incorporating emerging technologies such as the internet, artificial intelligence, and big data, which enable it to better address user requirements. In terms of financial regulation, many national governments are now adopting an increasingly accommodative stance toward fintech regulation, creating a favorable and open economic environment for the development and innovation of digital finance.

Regarding the social impact of digital finance, first, it can enhance the efficiency of resource allocation. By leveraging emerging technologies to precisely identify risks and opportunities, digital finance improves the overall efficiency of financial resource allocation. Second, it can expand the scope of financial services and meet diverse needs. Thanks to the internet, digital finance breaks down geographical barriers, broadening the reach of financial services. Furthermore, big data analysis enables the development of personalized solutions to meet the needs of different customers; Finally, digital finance can promote economic development; whether by providing financial support to the economy or by reducing the cost of financial services, it benefits China's economic growth. Research by Feng Yongqi (2024) concludes that the development of digital finance has a significant impact on enhancing the ability of financial services to support the real economy and on achieving high-quality development [3]; Meng Tian (2024) argues that digital finance promotes high-quality development in the real economy through services such as financing product innovation, information provision, and data governance [4]. In addition, Long Chi et al. (2023) found that the development of digital finance has reduced carbon emissions in the manufacturing sector, with a stronger effect observed in non-state-owned enterprises and large enterprises [5]. The above outlines the drivers of digital finance development and its macro-level impacts.

Below, we summarize the impacts of digital finance from a micro-level perspective. Digital finance influences enterprises by promoting digital transformation. This transformation not only encourages enterprises to actively develop core technologies to drive industrial upgrading and development but also enables them to better meet users' value needs. By enhancing corporate innovation and reducing costs, it ultimately drives an increase in corporate value. In this context, the power of corporate innovation should not be underestimated; He Fan et al. (2019) suggest that corporate technological innovation may play an intermediary role in the process by which digital finance promotes enterprise development [6]. Meanwhile, Wan Jiayu et al. (2020) argue that the development of digital finance can incentivize corporate innovation, with financing constraints serving as a mediating factor in this process [7]. Furthermore, Shu Huan et al. (2024) contend that digital finance can promote the green development of enterprises, thereby facilitating high-quality economic growth [8].

2.2. Study on the Valuation of High-Tech Enterprises

Promoting high-quality economic development is inseparable from the contribution of high-tech enterprises. Shu et al. (2017) found that high-tech enterprises located in high-tech zones exhibit higher productivity, export volumes, and innovation capabilities, and enjoy advantages in bank credit, playing a significant role in promoting productivity growth and export expansion [9].

There are many factors influencing the valuation of high-tech enterprises. For example, Jia Chunxiang et al. (2023) argue that improved corporate risk management enhances enterprise value, with equity concentration serving as a mediating factor [10]. Wang Lin et al. (2023) contend that high-tech enterprises exhibit significant cyclicity, and that their valuation is inextricably linked to their growth stage [11]. Zang Xingbing et al. (2023) argue that senior executives play a promotional role in enhancing corporate value, and that the greater a company's investment in innovation, the stronger this effect becomes [12]. Zhang Shuai et al. (2021) suggest that inclusive finance has varying effects on corporate value across different regions; their research found that digital finance has a positive impact on the market value of listed companies; private enterprises are more significantly

affected by it than state-owned and other types of enterprises; compared to enterprises in the central and western regions, those in the eastern region are affected more significantly [13].

In response to the numerous factors influencing corporate value assessment, various scholars have proposed different model-based research methods. Wei Kai et al. (2023) argue that a combined B-S and EVA model should be employed, as it can both avoid the shortcomings of the real options pricing model and quantify the value of intangible assets and human capital, thereby yielding more accurate empirical results [14]. Xie Yujiang (2017) also argues that, given the characteristics of high-tech enterprises, the EVA method should be used to assess enterprise value [15]. Zhang Shuai (2021), on the other hand, employed the event study method to examine the impact of the “G20 High-Level Principles on Digital Financial Inclusion” on enterprise value [13]. In addition, some scholars have studied enterprise performance levels by establishing fixed-effects models and mediation models, while others have used dynamic panel models to analyze enterprise performance.

2.3. Study on the Impact of Digital Finance on Firm Value

The rise of digital finance affects firm value in various ways. Research by Wu (2022) and Liu Junhang et al. (2023) has shown that digital finance can enhance the financial performance of new energy firms, while financing constraints have a robust negative impact on the financial performance of these firms. Furthermore, heterogeneity analysis reveals that the positive effect of digital finance is greater among small enterprises and non-state-owned enterprises; the inhibitory effect of financing constraints is more pronounced in larger enterprises; and this positive effect is more evident in inland regions [16,17]. Xie Tingting et al. (2022) also argue that the impact of corporate financialization on firm value exhibits significant heterogeneity across different types of liquid financial assets and firms of varying nature [18]. By alleviating financing constraints, digital finance addresses the issues of high financing costs and difficulty in accessing capital, thereby promoting corporate deleveraging during economic development. Of course, Li (2023) argues that the positive impact of digital finance remains limited for firms with high financing constraints and high leverage [19]. Furthermore, Yu Sitian (2023) argues that digital finance can improve corporate financing efficiency, provide liquidity to small and medium-sized enterprises (SMEs) facing high financing constraints, and enhance corporate operating performance [20]. At the same time, Gao (2023) and Liu (2022) contend that the financialization of SMEs significantly increases the risk of bankruptcy, whereas digital finance alleviates financing constraints, thereby reducing this risk [21,22]. Furthermore, Tang (2022) argues that digital finance exerts a structural driving force on the value of emerging enterprises and can enhance the value of strategic emerging enterprises through three pathways: capital supplementation, risk reduction, and innovation promotion [23]. Additionally, Lai Yue (2023) contends that digital finance can enhance the value of manufacturing enterprises and that this effect is long-term and sustainable [24]. The above provides an overview of past scholarly research on the impact of digital finance on corporate value.

2.4. Literature Review

A review of the literature on the current state of digital finance reveals that existing research on this topic focuses on digital finance itself, impact studies, and rural revitalization—all of which examine the macro-level development of digital finance and its impact on the overall economy. However, based on the findings of numerous scholars and in light of practical realities, the development of digital finance can indeed enhance corporate value at the micro level, with financing constraints and technological innovation serving as mediating factors. Various scholars have examined the impact of digital finance and digital transformation on corporate value appreciation across different types of enterprises, regions, and representative indicators. This paper utilizes panel data on high-tech enterprises and combines it with Peking University’s provincial-level indicators for digital inclusive finance to examine the effects of digital finance on corporate value. This enables high-tech enterprises to use these findings as a basis for enhancing their core technologies, cultivating outstanding innovation capabilities, and better allocating financial assets to maximize corporate value.

3. Theoretical Framework and Research Hypotheses

3.1. Theoretical Framework

The development of digital finance relies on information; financial innovation is achieved through the efficient transmission of information, which in turn further promotes economic development. The Efficient Market Hypothesis serves as the foundation for examining the impact of digital finance on the value of high-tech enterprises, supplemented by theories of incomplete and asymmetric information to provide further clarification. The theory of financial intermediation is used to explain how information, through the financial sector, influences high-tech enterprises in the real economy. Finally, transaction cost theory is employed to illustrate how digital finance effectively stimulates enterprise development. Taken together, these elements constitute the theoretical framework of this paper.

The core tenet of the Efficient Market Hypothesis is that information plays a crucial role in the efficient allocation of resources. Fama (1970) argued that the key to an efficient market lies in market participants' ability to react to information in a timely and accurate manner [25]. Efficient markets are classified into three types: weak-form efficiency (where historical information is reflected in prices), semi-strong-form efficiency (where both historical and publicly available information are reflected in prices), and strong-form efficiency (where all information, including corporate insider information, is reflected in prices). Digital finance is also information-based; advances in information technology drive the development of digital finance, which in turn increases the volume of information in the market, thereby more efficiently promoting market efficiency and maintaining price rationality and equilibrium.

The theory of information asymmetry posits that different market participants possess varying levels of information. Information asymmetry is a ubiquitous phenomenon in market economies and is of great significance for understanding market operations and participant behavior. There are many examples that support this theory. For instance, in the used car market, sellers are more aware of a vehicle's defects and issues, but they may fail to identify these problems, leading to buying and selling decisions that deviate from market equilibrium; The publication of corporate financial reports allows senior management to understand the company's operational status and financial structure, but ordinary investors may be unable to interpret detailed financial reports, preventing them from accurately assessing the company's value. The theory of incomplete information posits that in the real world, due to limited cognitive abilities and difficulties in accessing information, people cannot fully comprehend all events. While the market economy itself can, to a certain extent, promote the flow of information and the efficient allocation of resources, it is not a panacea and has its limitations. For example, in business negotiations, both parties may lack a complete understanding of each other's bottom lines and interests, leading to deadlocks or unfair agreements that undermine market equilibrium. With the development of digital finance, Xu Fang and He Jian (2022) argue that companies can rely on digital technology to obtain information; this technology can also provide analytical decision-making solutions, helping to reduce information asymmetry within firms [26].

In a market economy, the conversion of savings into investment is achieved through financial intermediaries, which serve as a central link. Modern financial intermediaries no longer merely act as a bridge connecting savings to investment; they also play a role in effectively managing risk, controlling costs, and creating added value [27]. During this conversion process, risk factors, information costs, and transaction costs constitute objective requirements. Financial intermediaries need to employ professional risk management strategies to mitigate investment risks, while leveraging information technology to reduce the costs of information acquisition and processing, and optimizing processes to minimize transaction costs. Furthermore, institutional frameworks and technology are practical prerequisites for financial intermediaries to facilitate this conversion. A sound financial system provides intermediaries with a standardized operating environment, ensuring the smooth progress of the transformation process; advanced information technology, in turn, provides intermediaries with powerful tool support, enabling them to process information and manage

risks more efficiently, and to provide higher-quality services to ultimate savers and investors. The development of digital finance has made information more diverse and comprehensive and reduced the risks associated with trade and investment, thereby demonstrating the intermediary utility of the financial industry, further adapting to the needs of enterprise development, and driving economic growth.

Coase argued that transaction costs are the costs incurred when people cooperate to complete a transaction. Business operations also generate transaction costs; excessive transaction costs can stifle enterprise development and hinder the refinement of the market economy. Scholars such as Xing Kaiyue and Li Haoyuan (2021) contend that big data expands the scope of financing by breaking through the constraints of time and space, while digital finance provides broader, deeper, and more precise financial services, thereby reducing transaction costs [28].

3.2. Research Hypotheses

Given that enterprises possess both diverse, structured information and unstructured information, Tang Song (2020) argues that digital finance can use data processing technologies to convert unstructured information into structured form [29], thereby providing the key information needed for enterprise development, efficiently driving business growth, and improving corporate performance. This is particularly true for high-tech enterprises undergoing rapid digital transformation, for which the development of digital finance serves as a vital catalyst for progress. Through the application of big data technology, digital finance significantly enhances information transparency, which not only helps market participants assess risks more accurately but also greatly simplifies transaction processes, thereby further reducing transaction costs [30,31]. This further illustrates how digital finance contributes to corporate value growth. Based on this, this paper proposes the following first hypothesis:

H1: Digital finance is conducive to enhancing the value of high-tech enterprises.

Previous scholars have concluded that digital finance can promote green innovation in enterprises [32]. Digital finance can provide financing services to enterprises through online loans, equity financing, and risk assessment services, thereby addressing corporate capital shortages; it improves service quality through digital technologies—for example, by using blockchain technology to digitize the entire process of corporate credit assessment, financing, and payments, which reduces transaction costs and enhances operational efficiency; it also offers risk management services—for instance, through technologies such as smart contracts to enable risk-sharing and profit-sharing between parties, thereby reducing the risks and costs associated with corporate innovation.

Technological innovation is the fundamental driving force behind the growth of technology-based enterprises [33]. Technological innovation can improve production efficiency—for example, by increasing output while keeping costs constant, thereby gaining a competitive advantage. It can also help enterprises reduce production costs and enhance profitability; for instance, new materials or processes can lower raw material consumption, reduce waste, and consequently lower product costs. Overall, technological innovation helps enterprises gain a greater competitive edge in the market, improve production efficiency, and reduce costs, thereby enhancing corporate value. Consequently, it is reasonable to infer that digital finance can promote enterprise development by incentivizing technological innovation, thereby increasing the value of high-tech enterprises. Based on the existing empirical evidence discussed above, and to investigate whether technological innovation plays a mediating role in the process by which digital finance drives the growth of high-tech enterprise value, this paper proposes the following second hypothesis:

H2: Technological innovation mediates the relationship between digital finance and the value of high-tech enterprises.

4. Variable Selection and Data Processing

4.1. Variable Selection

First, the Tobin's Q ratio was selected as the dependent variable to represent the value of high-tech enterprises. Compared to financial performance indicators (such as return on total assets and return on equity), market performance indicators (Tobin's Q ratio, market value, and Economic Value Added (EVA)) not only reflect a company's historical performance but also provide further insight into its future growth potential. Tobin's Q is an indicator of a company's value. When Q is greater than 1, the company's market value exceeds its replacement cost, and the company can raise additional capital by issuing more shares; when Q is less than 1, the company's market value is below its replacement cost, and the company's capital requirements will decrease. A key assumption of Tobin's Q theory is the existence of a perfect capital market. As China's capital market has become increasingly sophisticated, Tobin's Q (tobinq) is selected from among market performance indicators as the variable representing the value of high-tech enterprises.

Regarding the explanatory variable, the Peking University Digital Inclusive Finance Index was selected to represent digital finance. Following the methodology of Yu Ping (2020) and considering that the digital finance index tends to be relatively high, it was divided by 100 to obtain the explanatory variable (index100) [35].

Regarding the mediating variable, past empirical studies have employed two main approaches to evaluating technological innovation. The first is from an output perspective, where indicators such as the number of patent applications, holdings, and grants are considered good measures of technological innovation capacity; the second is from an investment perspective, focusing on R&D expenditures and their relative changes. With the development of digital finance, an increasing number of companies are placing greater emphasis on innovation. However, R&D investments made in a given year do not necessarily reflect in the output levels of that same year; in other words, there is a certain time lag between R&D investment and output levels. Given that firm value is measured on an annual basis, increased R&D investment can signal a company's growth to the market, attract investors, and thereby increase firm value. This means that, relative to output levels, R&D investment is more closely aligned with firm value. Therefore, this study selects R&D investment as the mediating variable to represent technological innovation.

Company size, profits, cash flow from operating activities, growth potential, and age are selected as control variables. Among these, company size affects capital requirements, which in turn influences corporate value; profitability refers to a company's ability to repay debt and manage risks, thereby affecting corporate value; and cash flow from operating activities is the most critical factor, as it is inextricably linked to corporate value assessment; a company's growth potential refers to the stage it is in; according to life cycle theory, corporate value changes over time; a company's age leads to differences between new and established firms in terms of risk management and maintaining business operations; older firms may be better equipped to handle challenges along their development path due to their wealth of experience; finally, different years may be characterized by varying macroeconomic policies, government support, and socioeconomic conditions, all of which influence corporate development and the growth of corporate value.

Table 1. Variable Definitions

Variable Type	Variable Name	Variable Symbols	Variable Definitions
Dependent Variable	Corporate Value	tobinq	(Market Capitalization / Total Assets) / 100
Independent Variable	Digital Inclusive Finance Index	Index100	Peking University Digital Inclusive Finance Index
Mediating Variable	Technological Innovation	lninput	Logarithm of R&D Expenditures
	Company Size	lnsize	Logarithm of Year-End Total Assets
	Profitability	profit	Return on Equity
	Cash Flow from Operating Activities	ocf	Net Cash Flow from Operating Activities
Control Variables	Company Growth	growth	Revenue Growth Rate
	Company Age	age	Company Age

4.2. Data Collection and Processing

To examine the impact of digital finance on the value of high-tech enterprises, we selected financial data from high-tech enterprises for the period 2011–2020 as our sample. The data were sourced from the “High-Tech Enterprise Certification Results,” Wind, and the CSMAR database. The following processing steps were applied to the total sample: (1) Financial companies were excluded, as their financial data are not comparable due to differences in capital operations; (2) ST and *ST companies with abnormal operations were excluded; (3) Excluded outliers and missing data.

The “Peking University Digital Inclusive Finance Index” from the Peking University Digital Research Center was used to characterize the development of digital finance in the provinces where high-tech enterprises are located. After statistical analysis using Excel and Stata 17, the sample was trimmed to reduce the influence of outliers, resulting in a final dataset of 16,268 observations.

4.3. Model Design

This study examines the impact of digital finance on firm value. We first use the F-test and the Hausman test to determine that the appropriate model type is a fixed-effects model. We then construct a mediation model to investigate the mediating role of technological innovation on firm value.

First, a fixed-effects model is established:

$$tobinq_{i,j,t} = \alpha_0 + \alpha_1 index_{i,j,t} + \alpha_2 \ln size_{i,j,t} + \alpha_3 profit_{i,j,t} + \alpha_4 ocf_{i,j,t} + \alpha_5 growth_{i,j,t} + \alpha_6 age_{i,j,t} + \delta_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

Where i , j , and t represent the firm, province, and year, respectively; $tobinq_{i,j,t}$ is firm value; $index_{i,j,t}$ is the digital inclusive finance index of the province where the firm is located; $\ln size_{i,j,t}$ is firm size; $profit_{i,j,t}$ is profitability; $growth_{i,j,t}$ is firm growth; $age_{i,j,t}$ is firm age; δ_i is the firm-level fixed effect; δ_t is the time-level fixed effect; and $\varepsilon_{i,t}$ is the random disturbance term.

Following the research by Wen Zhonglin et al. (2014) [36], we first test the impact of digital finance on technological innovation:

$$\ln input_{i,j,t} = \alpha_0 + \alpha_1 index_{i,j,t} + \alpha_2 \ln size_{i,j,t} + \alpha_3 profit_{i,j,t} + \alpha_4 ocf_{i,j,t} + \alpha_5 growth_{i,j,t} + \alpha_6 age_{i,j,t} + \delta_i + \delta_t + \varepsilon_{i,t} \quad (2)$$

Next, we include the mediating variable (R&D investment) to test the mediating effect:

$$tobinq_{i,j,t} = \alpha_0 + \alpha_1 index_{i,j,t} + \alpha_2 \ln input_{i,j,t} + \alpha_3 \ln size_{i,j,t} + \alpha_4 profit_{i,j,t} + \alpha_5 ocf_{i,j,t} + \alpha_6 growth_{i,j,t} + \alpha_7 age_{i,j,t} + \delta_i + \delta_t + \varepsilon_{i,t} \quad (3)$$

Based on the empirical results, first, if the coefficient in Equation (1) is significant, it indicates that the development of digital finance drives an increase in the value of high-tech enterprises. Next, if the coefficient in Equation (2) is significant, it indicates that digital finance has a significant impact on technological innovation. Next, if the coefficient of the mediating variable in Equation (3) is also significant, this indicates a significant indirect effect. Further examination of the coefficients of the explanatory variables is required: if they are not significant, this indicates a full mediation effect; if they are significant, one should then check whether the product of the coefficient in Equation (2) and the coefficient of the mediating variable in Equation (3) shares the same sign as the coefficient of the explanatory variable in Equation (3); if they share the same sign, this indicates a partial mediation effect. Furthermore, if at least one of the coefficients in Equation (2) or the coefficient of the mediating variable in Equation (3) is not significant, the mediating effect should be tested using the bootstrap or Sobel methods [37].

5. Empirical Research

5.1. Descriptive Statistics

Table 2. Descriptive Statistics for Variables

variables	n	mean	sd	min	max
tobinq	16,268	1.899	1.279	0.545	7.783
index100	16,268	2.675	0.941	0.339	4.179
lninput	16,267	17.96	1.217	14.98	21.39
lnsize	16,268	21.86	1.089	19.95	25.12
profit	16,268	0.0504	0.147	-0.912	0.277
growth	16,268	0.307	0.651	-0.683	3.951
ocf	16,268	3.218e+08	8.327e+08	-9.018e+08	5.600e+09
age	16,268	7.358	6.094	0	24

The Table 2 above presents the descriptive statistics for the variables used in this study. As shown in the table, the study selected a valid sample of 16,268 observations from 2011 to 2020. The analysis follows below.

The mean Tobin's q ratio, which represents the value of high-tech enterprises, is 1.899, with a minimum of 0.545 and a maximum of 7.783. This suggests that most enterprises have relatively low Tobin's q ratios, consistent with the characteristics of high-tech enterprises. Furthermore, the wide range of Tobin's q ratios indicates significant variation in enterprise value. The Digital Financial Inclusion Index, which represents the level of digital finance development, ranges from a minimum of 0.339 to a maximum of 4.179. Given that digital finance is an emerging sector, the fact that such a wide range in the Digital Financial Inclusion Index has emerged over just a few years demonstrates that digital finance has been developing at an extremely rapid pace in recent years. The minimum and maximum values for the logarithm of R&D investment—which represents corporate technological innovation—are 14.98 and 21.39, respectively. The wide range and generally high values suggest that high-tech enterprises generally invest more in technological innovation than ordinary enterprises, though there are some variations among different high-tech enterprises. The logarithm of total assets at the end of the period—a measure of company size—ranges from a minimum of 19.95 to a maximum of 25.12. This indicates significant variation in the scale of high-tech enterprises, encompassing both large companies and small and medium-sized enterprises. The average return on total assets (ROA), which represents profitability, is 0.0504, with maximum and minimum values of 0.277 and -0.912, respectively. This suggests that profitability among high-tech enterprises has varied greatly in recent years, with many companies reporting negative ROA; thus, the profitability of high-tech enterprises still needs improvement. The average revenue growth rate, which indicates a company's growth potential, is 0.307, with a maximum of 3.951 and a minimum of -0.683. This suggests that the majority of enterprises have positive revenue growth rates, indicating that high-tech enterprises generally possess strong growth potential and are in a phase of rapid development. The average company age is 7.358, with a maximum of 24 and a minimum of 0. This suggests that most high-tech enterprises are less than ten years old, representing a type of company that is just emerging and poised for vigorous growth.

5.2. Correlation Analysis

As shown in the Table 3, most of the correlation coefficients between the variables are small, indicating a low likelihood of multicollinearity and suggesting that regression analysis can be conducted. A company's Tobin's q is positively correlated with the Digital Inclusive Finance Index, which is consistent with Hypothesis 1 and warrants further modeling and discussion. Tobin's q is negatively correlated with the logarithm of R&D investment, which represents technological innovation; this preliminarily suggests that corporate value and technological innovation do not have a mutually reinforcing effect, and this will be further analyzed and discussed later. In addition, firm size and operating cash flow are negatively correlated with the Tobin's q ratio, suggesting that larger

firm size and higher net cash flow may inhibit the growth of firm value. Firm profitability, growth potential, firm age, and the year under study are all positively correlated with the Tobin's q ratio, indicating that stronger profitability, higher growth potential, older firms, and a more recent year all promote the growth of high-tech firms' value.

Table 3. Correlation Analysis of Variables

	tobinq	Index	lninput	lnsize	profit	growth	ocf	age
tobinq	1							
index100	0.064***	1						
lninput	-0.090***	0.238***	1					
lnsize	-0.237***	0.157***	0.754***	1				
profit	0.051***	-0.069***	0.111***	0.036***	1			
growth	0.051***	0.0110	-0.015*	-0.023***	0.024***	1		
ocf	-0.051***	0.109***	0.483***	0.571***	0.154***	-0.059***	1	
age	0.044***	0.143***	0.350***	0.518***	-0.136***	-0.016**	0.279***	1

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively.

Next, we use the VIF test to examine whether multicollinearity exists among the variables. As shown in the table 4, the variance inflation factors for the variables are less than 10, indicating that multicollinearity among the variables is negligible [38].

Table 4. Multicollinearity Test

variable	vif	1/vif
index100	1.08	0.927272
lninput	2.47	0.404810
lnsize	3.17	0.315034
profit	1.08	0.922277
growth	1.01	0.994804
ocf	1.54	0.649152
age	1.42	0.702470

5.3. Benchmark Regression Analysis

This paper uses panel data on high-tech enterprises from 2011 to 2020. First, an F-test was conducted to distinguish between fixed-effects and mixed-effects models; then, a Hausman test was performed to determine whether to use fixed or random effects. The F-test results showed $P = 0$, rejecting the null hypothesis (selecting the mixed-effects model). The Hausman test yielded $P = 0$, rejecting the null hypothesis (selecting the random-effects model). Therefore, a fixed-effects model was used.

We constructed models with firm-level fixed effects (controlling for firm), time-level fixed effects (controlling for year), and a two-way fixed effects model, with standard errors clustered at the provincial level. The results are shown in Table 5. In the firm-level and time-level fixed effects models, digital finance was significantly positively correlated with firm value, and this correlation held at the 1% significance level, with coefficients of 0.757 and 0.313, respectively; with the two-way fixed-effects model, digital finance is significantly positively correlated with firm value at the 5% level, with a coefficient of 0.574. This indicates that the development of digital finance can promote the growth of high-tech firms' value, thereby validating Hypothesis 1. In addition, the control variables—firm profitability and operating cash flow—are significantly positively correlated with firm value at the 1% level, suggesting that strong profitability and high operating cash flow promote the growth of firm value.

Table 5. The Impact of Digital Finance on the Value of High-Tech Enterprises

tobinq	Individual Fixed	Time-Based Fixed	Two-Way Fixed
index100	0.757*** (6.19)	0.313*** (4.66)	0.574** (2.6)
lnsize	-0.498*** (-11.83)	-0.506*** (-17.84)	-0.519*** (-12.2)
profit	0.553*** (7.27)	0.465*** (9.17)	0.428*** (8.14)
growth	0.0458* (1.93)	-0.0135 (-1.31)	-0.0335** (-2.37)
ocf	6.87e-11*** (3.32)	1.12e-10*** (4.86)	8.08e-11*** (3.12)
age	-0.139*** (-3.25)	0.0565*** (14.18)	0.168 (1.66)
cons	11.71*** (12.91)	11.59*** (19.17)	11.5*** (14.66)
observations	16268	16268	16268
R ²	0.0577	0.2875	0.2888

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

5.4. Analysis of the Mediating Effect

To examine the impact of digital finance on the value of high-tech enterprises through the mediating effect of technological innovation, we first analyze the impact of digital finance on technological innovation. Based on this, we construct a mediating effect model to determine whether digital finance acts as a facilitating or inhibiting factor.

To examine the impact of digital finance on technological innovation, we constructed models with firm-level controls, time-varying controls, and two-way controls, respectively. The results are presented in Table 6. When firm-level and time-varying controls are held constant, digital finance is positively correlated with technological innovation at the 1% and 5% significance levels, with coefficients of 0.162 and 0.148, respectively. In the two-way control model, however, the coefficient is negative and not statistically significant.

Table 6. The Impact of Digital Finance on Technological Innovation in High-Tech Enterprises

lninput	Individual Fixed	Time-Based Fixed	Two-Way Fixed
index100	0.162*** (3.563)	0.148** (2.25)	-0.126 (-0.86)
lnsize	0.683*** (29.51)	0.730*** (39.29)	0.695*** (30.38)
profit	0.089 (1.41)	0.138** (2.37)	0.102 (1.65)
growth	-0.0533*** (-3.21)	-0.0465*** (-3.04)	-0.0515*** (-3.26)
ocf	0** (2.63)	0*** (3.13)	0** (2.38)
age	0.00502 (0.29)	-0.00503* (-1.83)	0.0158 (0.68)
cons	2.551*** (5.32)	1.493*** (3.77)	2.396*** (5.01)
observations	16267	16267	16267
R ²	0.5636	0.5665	0.5678

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

After including the mediating variable (R&D investment) and establishing a mediating effects model, the results are shown in Table 7. In all three models, the coefficient for technological

innovation was significantly positive at the 1% level, with values of 0.0373, 0.152, and 0.0925, respectively.

Table 7. The Mediating Role of Technological Innovation in the Impact of Digital Finance on the Value of High-Tech Enterprises

tobinq	Individual Fixed	Time-Based Fixed	Two-Way Fixed
index100	0.751*** (6.09)	0.268*** (4.12)	0.586** (2.59)
lninput	0.0373** (2.21)	0.152*** (9.8)	0.0925*** (4.33)
lnsize	-0.523*** (-12.73)	-0.623*** (-24.85)	-0.584*** (-16.09)
profit	0.549*** (7.19)	0.433*** (8.65)	0.418*** (8.01)
growth	0.0479* (1.99)	-0.00721 (-0.75)	-0.0286* (-2.04)
ocf	6.71e-11*** (3.26)	1.04e-10*** (4.69)	7.73e-11*** (3.05)
age	-0.139*** (-3.23)	0.0574*** (13.85)	0.167 (1.65)
cons	11.61*** (12.69)	11.50*** (19.6)	11.27*** (14.04)
observations	16267	16267	16267
R ²	0.0579	0.2884	0.2903

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

At this point, the three-step model for testing the mediating effect has been established. Given the issue of insignificant coefficients in the model examining the impact of digital finance on technological innovation, we further employed the Sobel and bootstrap methods to test the mediating effect. Sobel test: The results in Table 8 show a Z-value of 13.46 and a p-value of 0, indicating a significant result. All coefficients are significantly positive, and the mediation effect accounts for approximately 25.41% of the total effect. This indicates that approximately 25.41% of the impact is transmitted through the mediating variable, and the ratio of the indirect effect to the direct effect is approximately 34.07%, which represents the magnitude of the indirect effect relative to the direct effect.

Table 8. Empirical Results of the Sobel Test

	coef	Std err	z	p> z
Sobel	0.032	0.0024	13.46	0
Aroian	0.032	0.002	13.4	0
goodman	0.032	0.0024	13.47	0
	coef	Std err	z	p> z
Coefficient of the Impact of Digital Finance on Technological Innovation	0.168	0.007	25.57	0
Coefficient of the Impact of Technological Innovation on Corporate Value	0.191	0.012	15.83	0
Indirect Effect	0.032	0.002	13.46	0
Direct Effect	0.094	0.010	9.14	0
Total Effect	0.126	0.010	12.40	0
Proportion of the Mediating Effect in the Total Effect				0.254
Ratio of Indirect Effect to Direct Effect				0.341
Ratio of Total Effect to Direct Effect				1.341

Bootstrap method: As shown in Table 9, the confidence interval obtained after adjusting for mediating effects is 0.017–0.026, which does not include 0, indicating that the result is significant. In summary, technological innovation plays a mediating role in the impact of digital finance on the value of high-tech enterprises, and Hypothesis 2 is supported.

Table 9. Empirical Results of the Bootstrap Test

	Observed coefficient	Std.err	[95% conf. interval] (bc)	
Indirect	0.022	0.002	0.017	0.026
direct	0.191	0.013	0.165	0.214

5.5. Robustness Tests

We conducted robustness tests by substituting the first-order lagged digital finance index for the explanatory variable. The regression results are shown in Table 10. In the individual-fixed, time-fixed, and two-way fixed models, the first-order lagged digital finance index was significantly positively correlated with firm value at the 1%, 1%, and 5% significance levels, with coefficients of 1.843, 0.313, and 0.46, respectively. This indicates that the first-order lagged digital finance index has a positive effect on corporate value growth. Consistent with the models described above, this suggests that the model exhibits a high degree of robustness.

Table 10. Substituting the Digital Finance Index for the Explanatory Variables with a First-Order Lag

tobinq	Individual Fixed	Time-Based Fixed	Two-Way Fixed
L.index100	1.843*** (25.41)	0.313*** (4.64)	0.460** (2.38)
lnsize	-0.539*** (-14.43)	-0.557*** (-29.97)	-0.586*** (-15.44)
profit	0.501*** (6.66)	0.421*** (7.21)	0.366*** (5.08)
growth	0.0348 (1.48)	-0.00571 (-0.34)	-0.0209 (-0.97)
ocf	1.06e-10*** (5.51)	1.54e-10*** (11.64)	1.26e-10*** (6.23)
age	0.0657 (0.86)	0.0436*** (12.37)	0.0664 (0.97)
cons	12.69*** (8.14)	12.72*** (32.27)	13.20*** (15.98)
observations	13788	13788	13788
R ²	0.1027	0.3104	0.3112

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

Table 11. Return on Equity as a Substitute for the Dependent Variable

roe	Individual Fixed	Time-Based Fixed	Two-Way Fixed
index100	0.0996*** (4.31)	0.0416* (1.95)	0.125* (1.9)
lnsize	0.0310** (2.26)	0.00460 (0.77)	0.0283* (1.97)
profit	13.37*** (55.98)	13.31*** (58.48)	13.34*** (56.42)
growth	0.00680 (0.93)	0.0118 (1.49)	0.00905 (1.24)
ocf	0 (0.24)	-0 (-0.71)	0 (0.29)
age	0.0163** (2.15)	-0.0110*** (-10.33)	-0.0359 (-1.01)
cons	-2.116*** (-7.26)	-1.582*** (-12.7)	-1.921*** (-5.76)
observations	14692	14692	14692
R ²	0.7078	0.7081	0.7086

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

Drawing on relevant research by previous scholars, we use return on equity (ROE) in place of Tobin's q to assess robustness. The regression results are shown in Table 11. In the individual fixed-

effects model, the coefficient is significantly positive at the 1% level. In the latter two models, digital finance and firm value are significantly positively correlated at the 10% level, with coefficients of 0.0416 and 0.125, respectively. This indicates that the digital finance index positively promotes firm value growth. Consistent with the models discussed above, this suggests that this model exhibits a high degree of robustness.

Robustness tests were conducted using the Peking University Digital Inclusive Finance Index's provincial-level indices for coverage breadth, usage depth, and digitalization level as explanatory variables [39]. As shown in Table 12, the breadth of digital finance coverage is positively correlated with firm value at the 1% significance level, with a coefficient of 0.699; thus, the breadth of digital finance coverage positively promotes firm value growth [40]; The variable for the depth of digital finance usage is significantly positively correlated with firm value at the 5% significance level, with a coefficient of 0.309, indicating that the depth of digital finance usage positively promotes firm value growth. All of the above results passed the robustness tests. The level of digitalization in digital finance is positively correlated with firm value, with a coefficient of 0.0469, but this correlation is not significant. The lack of significance in these results may stem from several factors. The impact of the level of digitization on corporate value is related to the firm's life cycle and nature; it has a greater impact on firms in the maturity and growth stages, as well as on state-owned enterprises and highly market-oriented firms [41]. In this study, the sample consists of high-tech enterprises, and no classification was made based on firm life cycle or nature. If the majority of firms are in the decline stage and are not state-owned enterprises, the impact of the level of digitization on corporate value would not be significant, which explains why the regression results are not significant.

Table 12. Replacing Explanatory Variables with Indices of Coverage, Usage Depth, and Digitalization

tobinq	Two-Way Fixed		
wide index100	0.699*** (2.98)		
deep index100		0.309** (2.55)	
digit index100			0.0469 (0.37)
lnsize	-0.517*** (-12.26)	-0.520*** (-12.02)	-0.515*** (-12.11)
profit	0.419*** (8.18)	0.428*** (8.11)	0.424*** (8.06)
growth	-0.0348** (-2.51)	-0.0331** (-2.3)	-0.0343** (-2.43)
ocf	8.00e-11*** (3.07)	8.22e-11*** (3.2)	8.14e-11*** (3.13)
age	0.165 (1.68)	0.170* (1.7)	0.172* (1.75)
cons	11.36*** (14.04)	11.62*** (14.91)	11.73*** (14.9)
observations	16268	16268	16268
R ²	0.2887	0.2888	0.2877

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

5.6. Analysis of Heterogeneity

Xu Bing argues that the role of digital finance in promoting the development of the real economy exhibits regional heterogeneity [34]. In China, the eastern and western regions differ in terms of the level of digital finance development, economic development, and industrial structure, and the impact of digital finance on corporate value also varies. These differences result in enterprises in different regions facing distinct conditions and challenges when utilizing digital finance to enhance their own

value. From the perspective of digital finance development, due to their economically developed regions and abundant financial resources, enterprises in the eastern regions have easier access to digital financial services, making it simpler for them to achieve digital transformation and innovative development. In contrast, the situation is the opposite in the central and western regions; therefore, enterprises in these areas may face greater difficulties and challenges in terms of digital transformation and innovative development; From the perspective of economic development levels and industrial structures, the eastern regions have higher levels of economic development and more advanced industrial structures, making it easier for enterprises to achieve industrial upgrading and innovative development through digital finance. In contrast, the central and western regions have relatively lower levels of economic development and relatively backward industrial structures, so enterprises there may rely more heavily on digital finance to address issues such as difficult and expensive access to financing in order to ensure their survival and development; In terms of educational resources, the eastern regions are relatively well-endowed, making it easier for enterprises to access high-quality talent and technical support, thereby facilitating digital transformation and innovative development. In contrast, the central and western regions suffer from relatively scarce educational resources, and enterprises there may face talent shortages and insufficient technical support, which also affects the impact of digital finance on enterprise value. Therefore, this study examines the regional heterogeneity in the impact of digital finance on the value of high-tech enterprises.

The sample data were divided into eastern and central-western enterprises by province. The results are shown in Table 13: in the eastern region, digital finance is significantly positively correlated with enterprise value at the 1% significance level, with a coefficient of 0.329; in the central-western region, digital finance is significantly positively correlated with enterprise value at the 5% significance level, with a coefficient of 0.854. This indicates that digital finance promotes enterprise value growth in both the eastern and central-western regions.

Next, we conducted a t-test to examine differences in coefficients between groups. The results show that the p-value is less than 0.05, indicating that the regression coefficients of the independent variables in the two models are comparable. The coefficient of the explanatory variable in the eastern region is slightly lower than that in the central and western regions. This can be attributed to the fact that the development of digital finance has improved the economic environment in regions of the west with slower economic growth, narrowing the gap in financial development between the east and west and leading to rapid financial development in the west [38], which has significantly enhanced the value of high-tech enterprises.

Table 13. Test for Regional Heterogeneity

tobinq	Eastern Region	Central and Western Regions
index100	0.329*** (3.02)	0.854** (2.53)
lnsize	-0.497*** (-15)	-0.572*** (-7.92)
profit	0.512*** (7.68)	0.284*** (4.58)
growth	-0.00472 (-0.46)	-0.0429** (-2.29)
ocf	1.35e-10*** (3.98)	6.04e-11*** (2.95)
age	0.0622*** (14.37)	0.125 (1.06)
cons	11.30*** (16.5)	12.75*** (8.7)
observations	12358	3910
R ²	0.2960	0.2768

Note: *, **, and *** indicate significance levels of 1%, 5%, and 10%, respectively; the numbers in parentheses are t-values.

6. Research Findings and Policy Recommendations

6.1. Research Findings

This study utilizes panel data comprising the Digital Finance Index and financial indicators of high-tech enterprises from 2011 to 2020 to examine the impact of digital finance on the value of high-tech enterprises. Based on the relevant theoretical framework, research hypotheses were formulated. Mathematical and empirical analyses were subsequently conducted to test these hypotheses, examining the role of digital finance in corporate value; technological innovation was identified as a key mediating factor; and the impact varied across different regions. The conclusions are summarized below.

First, the development of digital finance promotes an increase in the value of high-tech enterprises. Digital finance can reduce corporate financing costs and improve capital utilization efficiency [17]; it provides enterprises with a more diversified range of products and services; by introducing intelligent and automated management tools, it lowers operating costs and enhances operational efficiency; and it enables enterprises to utilize digital means for risk management and control, thereby enhancing corporate value.

Second, technological innovation acts as a mediating factor in the process by which digital finance influences corporate value. First, digital finance effectively promotes technological innovation in enterprises: as the core driving force of high-tech enterprises, technological innovation and the development of digital finance reinforce one another. Next, digital finance can enhance corporate value by fostering technological innovation: it reduces information-gathering costs and enhances financing capabilities, enabling enterprises to increase R&D investment, which in turn drives product upgrades—all of which provide a continuous source of momentum for corporate value growth.

Third, the impact of digital finance on the value of high-tech enterprises varies between the eastern and central-western regions. Although the economic environment in China's central and western regions is relatively underdeveloped, this study finds that the development of digital finance in these regions has a stronger effect on enhancing the value of high-tech enterprises than in the eastern region. This can be interpreted as follows: the economic environment in the central and western regions has improved significantly due to the development of digital finance, narrowing the financial gap between the two regions; consequently, digital finance in the central and western regions has a particularly strong effect on enhancing the value of high-tech enterprises.

6.2. Policy Recommendations

First, continue to advance the development of digital finance. The government should improve the construction of digital finance infrastructure while strengthening the training of digital finance talent. Digital finance can create new opportunities for sustainable development, but achieving accurate and efficient digital information transmission relies heavily on comprehensive information infrastructure and digital platforms. It also requires the participation of digital experts and financial professionals to identify and manage risks associated with digital finance and avoid reckless investment. Digital finance possesses both enormous potential and advantages—it can inject new vitality into financial markets and drive economic growth and innovation in financial services—but it also faces the risk of distorted development, which could disrupt market order and lead to a series of negative consequences. On the one hand, by providing more convenient and efficient financial services, digital finance enables more businesses and individuals to benefit from these services. On the other hand, due to the highly virtual and cross-border nature of digital finance, regulation becomes more challenging, making it prone to fostering illegal financial activities. Therefore, regulatory authorities should strengthen monitoring and evaluation of the digital finance market. At the same time, international cooperation must be enhanced to jointly address the challenges and risks posed by digital finance. At the corporate level, companies must strive to complete their digital transformation; particularly spurred by the innovative environment of digital finance, high-tech enterprises hold promising prospects for achieving this transformation.

Second, the role of technological innovation in corporate growth and economic development must be emphasized. R&D activities, including technological innovation, are the core drivers of sustainable corporate development. However, these R&D activities are typically characterized by high investment, long cycles, high risk, and strict confidentiality, resulting in higher financing costs for technological innovation. Through digital financial services, enterprises can more effectively secure financial support, thereby alleviating the high costs associated with the technological innovation process and further incentivizing value creation for high-tech enterprises. To fully leverage the advantages of digital finance, enterprises can actively cultivate talent with multidisciplinary technical expertise to break through innovation barriers. At the same time, by integrating digital financial services, they can jointly build a digital financial information database to achieve resource sharing and information exchange. Such an approach not only helps reduce enterprises' financing costs but also enhances their overall innovation capacity and market competitiveness, driving corporate value creation and economic development.

Third, emphasis should be placed on the coordinated development of digital finance across different regions. The development of digital finance shows a general trend toward narrowing the gap between the eastern and central-western regions. Therefore, while ensuring that the financial prosperity and economic vitality of the eastern regions remain intact, we must also continue to increase policy support for the central and western regions. This means we need to take measures to promote resource sharing and complementary advantages between the eastern and western regions. Implementing such strategies can achieve balanced development between the two regions, thereby driving balanced economic growth across the entire nation. This coordinated development not only helps narrow the gap between the eastern and central-western regions but also stimulates social innovation and provides fertile ground for the rapid growth of high-tech industries. In other words, only when the eastern region's economic foundation and technological innovation capabilities are combined with the vast land and abundant resources of the central and western regions can we truly achieve the synergistic progress of high-tech enterprises across all regions, ultimately driving the comprehensive prosperity of China's economy.

References

- [1] Huang Yiping, Tao Kunyu. China's digital finance revolution: Development, impacts and regulatory implications[J]. *International Economic Review*, 2019, 6:24-35.
- [2] Ma Yingying. Research on the impact of digital finance on high-quality economic development in Guangxi[J]. *Business Exhibition Economy*, 2024(07):156-159.
- [3] Feng Yongqi, Lin Huangfeng. Mechanism and realization path of digital finance empowering high-quality enterprise development[J]. *Contemporary Economic Science*, 1-15.
- [4] Meng Tian, Yao Congli. Statistical evaluation on the coupled and coordinated development of digital finance and high-quality real economy[J]. *Statistics & Decision*, 2024, 40(08):150-155.
- [5] Long Chi, Zhang Hongmei. How does digital finance affect carbon emissions of manufacturing enterprises — From the perspective of enterprise digital transformation[J]. *Financial Theory and Practice*, 2023(10):67-78.
- [6] He Fan, Liu Hongxia. Performance improvement effect evaluation of digital transformation of physical enterprises from the perspective of digital economy[J]. *Reform*, 2019, 4:137-148.
- [7] Wan Jiayu, Zhou Qin, Xiao Yi. Digital finance, financing constraints and enterprise innovation[J]. *Economic Review*, 2020, 1:71-83.
- [8] Shu Huan, Huang Tingting. Mechanism and influence effect of digital finance on enterprises' green technology innovation[J]. *Nanjing Social Sciences*, 2024(04):47-58.
- [9] Shu Q, Yano G. High and New Technology Enterprise Performance and Financial Constraints: Is Clustering Efficient? [J]. *Applied Economics and Finance*, 2017, 4(6):64-77.

- [10] Jia Chunxiang, Sun Ziwei. Enterprise comprehensive risk management, ownership concentration and enterprise value — Empirical evidence from A-share high-tech enterprises in China[J]. *Modern Business*, 2023(02):142-145.
- [11] Wang Lin. Research on value evaluation of growing high-tech enterprises[J]. *Business Exhibition Economy*, 2023(10):165-168.
- [12] Zang Xingbing, Ji Lei. Influence of abundance of senior executives' career experience on enterprise value of high-tech enterprises[J]. *China Collective Economy*, 2023(08):113-116.
- [13] Zhang Shuai, Wang Wenli. The impact of digital inclusive finance on corporate market value — Analysis based on event study method[J]. *Regional Financial Research*, 2021(10):68-73.
- [14] Wei Kai, Li Zhou. Literature review on value evaluation of growing high-tech enterprises[J]. *National Circulation Economy*, 2023(20):76-79.
- [15] Xie Yujiang. Value evaluation of growing high-tech enterprises based on EVA[J]. *Finance and Accounting Communications*, 2017(05):7-11.
- [16] Wu Yilin, Huang Shilei. The effects of digital finance and financial constraint on financial performance: Firm-level evidence from China's new energy enterprises[J]. *Energy Economics*, 2022, 112:106-158.
- [17] Liu Junhang, Liu Shuchang. The impact of digital finance on enterprise value — Moderating effect based on shadow banking[J]. *Industrial Technology & Economy*, 2023, 42(03):92-98.
- [18] Xie Tingting, Liu Jialin. The impact of financialization of high-tech enterprises on enterprise value — Mediating effect based on dual innovation investment[J]. *Journal of Jilin Business and Technology College*, 2022, 38(01):38-46.
- [19] Li Mingrui, Hu Jin, Liu Pengzhen, et al. How can digital finance boost enterprises' high-quality development? Evidence from China[J]. *Environmental Science and Pollution Research International*, 2023, 30(38):88876-88890.
- [20] Yu Sitian. Research on digital finance and corporate financing efficiency — Empirical analysis and mechanism test based on A-share listed companies[J]. *China Business Journal*, 2023(21):113-116.
- [21] Gao Xue, Ren Yixin. The impact of digital finance on SMEs financialization: Evidence from thirty million Chinese enterprise registrations[J]. *Heliyon*, 2023, 9(8):1-14.
- [22] Liu Yingyuan, Jin Dandan, Liu Yuemin, et al. Digital finance, corporate financialization and enterprise operating performance: an empirical research based on Chinese A-share non-financial enterprises[J]. *Electronic Commerce Research*, 2022, 23(1):231-256.
- [23] Tang Xuan, Ding Shengtao, Gao Xing, et al. Can digital finance help increase the value of strategic emerging enterprises? [J]. *Sustainable Cities and Society*, 2022:1-12.
- [24] Lai Yue, Lu Xiaohui, Yang Ting, et al. An empirical study on digital finance improving the value of manufacturing enterprises — Empirical data of Chinese A-share listed companies from 2011 to 2020[J]. *Times Economic & Trade*, 2023, 20(04):98-103.
- [25] Fama E. The behavior of stock market prices[J]. *Journal of Business*, 1970, 38:34-106.
- [26] Xu Fang, He Jian. Digital finance development and corporate financial risk — From the perspective of financing constraints and information asymmetry[J]. *Technoeconomics & Management Research*, 2022(7):60-65.
- [27] Hu Qingkang, Liu Zonghua, Wei Haigang. Evolution and new progress of financial intermediation theory[J]. *World Economic Papers*, 2003(03):67-80.
- [28] Xing Kaiyue, Li Haoyuan, Di Yingfeng. Advantages and suggestions of digital inclusive finance alleviating financing difficulties of small and medium-sized enterprises[J]. *Investment and Entrepreneurship*, 2021, 32(20):1-3.
- [29] Tang Song, Wu Xuchuan, Zhu Jia. Digital finance and corporate technological innovation — Structural characteristics, mechanism identification and effect differences under financial supervision[J]. *Journal of Management World*, 2020, 36(05):52-66.
- [30] Huang Yiping, Qiu Han. Big tech credit: A new framework for credit risk management[J]. *Journal of Management World*, 2021, 37(02):12-21.
- [31] Motta V, Sharma A. Lending Technologies and Access to Finance for SMEs in the Hospitality Industry[J]. *International Journal of Hospitality Management*, 2020, 86:192-197.

- [32] Cheng Qiuwang, Lin Qiaohua, Shi Yuting. Research on the impact of digital inclusive finance on green innovation of small and medium-sized enterprises[J]. *Finance & Economy*, 2023(12):62-75.
- [33] Zhang Lihua. Investment-loan linkage financing analysis of technology-based small and medium-sized enterprises[J]. *Finance and Accounting Communications*, 2020(20):148-151.
- [34] Xu Bing. Digital finance, human capital investment and real economy development[J]. *Price: Theory & Practice*, 2023(12):180-183.
- [35] Yu Ping, Dou Junxia. Does the development of digital inclusive finance ease financing constraints of small and medium-sized enterprises [J]. *Monthly Journal of Finance and Accounting*, 2020(3):140-146.
- [36] Wen Zhonglin, Ye Baojuan. Testing moderated mediation models: Competition or substitution? [J]. *Acta Psychologica Sinica*, 2014(05):714-726.
- [37] Wang Zifeng, Zhang Guiwen. The impact of the return of migrant agricultural laborers on land circulation under the background of rural revitalization[J]. *Social Sciences Horizon*, 2023, 38(02):58-66.
- [38] Liu Xinduo. An empirical study on the impact of digital finance on the performance of high-tech enterprises[D]. Jilin University, 2022.
- [39] Yang Xue, Feng Bao. Can digital inclusive finance narrow the urban-rural income gap? Analysis based on provincial panel data from 2011 to 2020[J]. *Modern Finance*, 2023(09):25-33.
- [40] Zhang Wenfei, Jin Xiangyi. Does digital finance improve the value of small and medium-sized high-tech enterprises? [J]. *Research on Financial Education*, 2024, 37(02):19-31.
- [41] Wang Tianli, Wang Jingda. Digital transformation, enterprise life cycle and enterprise value[J]. *Research on Economics and Management*, 2023, 44(07):106-125.